

## Bellringer

→ How do new species form?

→ Look at these characteristics of humans:

- ★ upright walking
- ★ fingerprints
- ★ hair
- ★ speech
- ★ binocular vision

→ What are some disadvantages to these characteristics?

## Bellringer

Natural Selection = How

→ What is evolution?  
accumulations of changes over time

→ Explain how the need for a new annual flu vaccine is an example of evolution.

→ What is an adaptation? Give an example.

## Chapter 7 Evolution of Living Things

### 7.1 Change over time

#### I. Differences among organisms

A. Adaptation - characteristic that helps an organism survive and reproduce in its environment

1. Adaptations can be physical characteristics or behaviors

B. Species - a group of organisms that can mate with one another and produce fertile offspring

1. Groups of individuals = population

C. Evolution - the process in which populations gradually change over time

## II Evidence of Changes Over Time

- A. Fossils - remains or imprints of once-living organisms found in layers of rock; generally found in sedimentary rock
- B. Fossil Record - a historical sequence of life indicated by fossils found in layers of Earth's crust

## III Evidence of Ancestry

- A. Fossil record provides evidence about the order in which species have existed
- B. Drawing conclusions
  - 1. Scientists use the fossil record to draw connections between <sup>extinct</sup> living organisms; show relationships in the "tree of life"

## IV Examining Organisms

- A. Whales are mammals; they breathe air, give birth to live young, and produce milk
  - 1. According to fossil evidence whales could have evolved from a four-legged mammal walked on land

## V Comparing Organisms

- A. Comparing an organism's DNA and/or skeletal structures help trace an organism's relationship to common ancestors

# 7.1 Review

Grade: 7th

Subject: Life Science

Date:

- 1 A group of organisms that are closely related and can mate to produce fertile offspring is a species.

True

False

2 A(n) \_\_\_\_\_ helps an organism survive.

adaptation

3 A human's arm, a cat's front leg, a dolphin's front flipper, and a bat's wing ...

A have similar kinds of bones

B are used in similar ways

C are very similar to insect wings and jellyfish tentacles

D have nothing in common

4 When populations change over time, evolution has occurred.

☒ True

☐ False

5 The fossil record shows that species have changed over time. This is indicated by whales having very small hip bones, which suggests that whales once upon a time had hips to support legs for walking.

☒ True

☐ False

## 7.2 How does Evolution happen?

### I. Charles Darwin (naturalist - scientist who studies nature)

A. Darwin took the ship, HMS Beagle, on a long journey

1. Darwin collected thousands of plants and animal samples and kept careful notes on his observations

2. Darwin ended up @ the Galapagos Islands (chain of islands) studying finches

B. Galapagos Islands are 600 miles from Ecuador; Darwin noticed plant and animal species on island were similar but different than organisms in Ecuador

1. Each finch on the different islands had slightly different adaptations

### II. Darwin's Thinking

A. Darwin hypothesized that the island finches descended from Ecuador finches

### B. Ideas about breeding

1. Trait - a characteristic that can be passed from parents to their offspring through genes

2. Selective breeding - the human practice of breeding animal or plants that have certain desired traits (dogs)

### C. Ideas about Population

1. Darwin read work of Thomas Malthus, which stated human populations could not support unlimited growth. Darwin then theorized that offspring of surviving organisms inherit traits that help the offspring survive (natural selection)

### III. Darwin's theory of Natural Selection

A. Natural selection - the process by which individuals that are better adapted to the environment survive and reproduce more successfully than less well adapted individuals do

### B. Genetics and Evolution

1. Changes in genes may happen whenever organisms produce offspring

## Bellringer

→ what did Charles Darwin not know about evidence for evolution?

→ create a word (mnemonic) device

for the 4 principles of natural selection.

DNA  
Genetics  
oiu  
sts  
sr  
Stois

1) overproduction <sup>Sior Rios oisr</sup> over product

2) Inherited variation <sup>op iu</sup>

3) Struggle to Survive <sup>stos sure</sup>

4) Successful reproduction

# Evolution (part 2) Review

Grade: 7th

Subject: Life Science

Date:

1 Which of the following is NOT a source for Darwin's ideas about evolution?

- A characteristics of Galapagos animals
- B selective breeding by farmers and animal breeders
- C the ideas and observations of Thomas Malthus and Charles Lyell
- D scientists' knowledge of genetic changes

2 What did Darwin NOT understand about the process of evolution?

- A the slowness of the process
- B the importance of separation
- C the role of genetics
- D the importance of competition

3 A part of natural selection in which an animal produces a large number of offspring is called overproduction.

True  
False

,

4 Part of natural selection in which individuals have different traits is called inherited variation.

~~True~~  
False

.

5 Characteristic that can be passed from parent to offspring through genes is known as a \_\_\_\_\_.

. trait

.

6 The process by which organisms that are better adapted to survive and reproduce more successfully than organisms that are less well adapted is selective breeding.

True

False

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### 7.3 Natural Selection in Action

#### I. Changes in Population

A. Bacteria give a good example of how natural selection occurs:

1. Antibiotics are used to kill bacteria, but a few have an adaptation that prevents them from being killed. Therefore, this population continues to produce offspring that is resistant to antibiotics

B. Adaptation to Hunting

1. There are many tuskless elephants in the elephant population because hunting has eliminated many of the tusked elephants. Thus, the tuskless elephants produce more offspring making tusked elephants increasingly rare.

C. Insecticide Resistance

1. Insecticide only kills insects susceptible to the poison; resistant plants continue to survive and reproduce
2. Generation time - average time between one generation and the next

D. Competition for mates can select for adaptations, making certain adaptations more common in populations.

#### II Forming a New Species

A. Speciation - formation of a new species as result of evolution

1. Separation - a barrier preventing populations from mating can lead to a new species
2. Different environmental conditions can cause speciation
3. Division - even after a barrier is removed, two populations that have been separated for a period of time, will still not reproduce when reunited

# Chapter 7 Review

Grade: 7th

Subject: Life Science

Date:

1 The process consisting of separation, adaptation, and division is...

A mating

B isolation

C resistance

D speciation

2 Which of the following is NOT an example of natural selection?

- A people breeding horses to run faster
- B bacteria populations becoming resistant to antibiotics
- C insect populations developing resistance to certain pesticides
- D male birds of certain species developing colorful feathers to attract female mates

3 The splitting apart of a portion of a population is \_\_\_\_\_.

Separation

4 The evolving of traits in response to environmental conditions is a ~~generation time~~.

*adaptation*

True

False

5 The result of two groups becoming so different that they may no longer interbreed is \_\_\_\_\_.

*division*

6 The slow process of change through natural selection or genetic change is known as \_\_\_\_\_.

evolution

7 The formation of a new species as a result of evolution is called speciation.

True

False

8 Evidence of common ancestors can be found in \_\_\_\_\_ and living organisms.

fossils

9 Insects surviving an attack by insecticides are more likely to have offspring <sup>than those who</sup> ~~who~~ are insecticide susceptible.

True

False

10 Farmers and animal breeders choose to breed animals with desirable traits in a process known as \_\_\_\_\_.

A evolution

B speciation

C selection

D selective breeding

11 When an organism with a gene that helps it survive and reproduce actually reproduces, the process of natural selection occurs.

True

False

12 A characteristic that improves an organism's ability to survive is a(n)...

- A adaptation
- B inherited variation
- C reproduction
- D breeding

13 Darwin could not answer all of the questions regarding his new theory, because he did not know about...

- A adaptation
- B inherited variation
- C reproduction
- D genetics

14 The fact that an organism's offspring are not identical is known as ...

A adaptation

B inherited variation

C reproduction

D genetics

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15 Minerals seeping into an organism's remains form...

A sediments

B imprints

C layers

D fossils

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16 Darwin theorized that individuals having an advantage due to their traits or abilities will be more likely to survive and reproduce. His theory is known as....

- A evolution
- B speciation
- C adaptation
- D natural selection

17 The four main parts of natural selection include overproduction (species produce more offspring than will survive to be adults), inherited variation (individuals in populations will differ in traits), competition (individuals in a population will compete for survival), and successful reproduction (individuals with the best adaptations to the environment are more likely to survive and reproduce).

- True
- False

